

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently Amended) A regeneration controller for eliminating particulate matter accumulated in an exhaust purification apparatus in an exhaust system of an internal combustion engine, in which exhaust having an air-fuel ratio passes through the exhaust system during engine operation, wherein the exhaust apparatus includes catalyst, the regeneration controller comprising:

a heating section for heating the exhaust purification apparatus and eliminating the particulate matter accumulated in the exhaust purification apparatus when an estimated accumulation amount is greater than a reference accumulation amount, the heating section obtaining the estimated accumulation amount by estimating the amount of particulate matter accumulated in the exhaust purification apparatus;

a temperature detector for detecting temperature of the exhaust purification apparatus;

a control section for repeatedly changing the air-fuel ratio of the exhaust between a rich state and a lean state to perform burn-up heating of the exhaust purification apparatus for burning the particulate matter accumulated in the exhaust purification apparatus and for continuously lowering the air-fuel ratio of the exhaust to perform normal heating of the exhaust purification apparatus, wherein the control section performs burn-up heating when the estimated accumulation amount is less than or equal to a burn-up start determination value and performs normal heating when the estimated accumulation amount is greater than the reference accumulation amount and the burn-up start determination value, and wherein the control section switches the heating of the exhaust purification apparatus from the normal heating to the burn-up heating when the estimated accumulation amount obtained in a period in which heating of the exhaust purification apparatus is being performed becomes less than or equal to the burn-up start determination value; and

a prohibition section for prohibiting burn-up heating when the temperature detected by the temperature detector decreases to a catalyst inactivation level.

2. (Original) A regeneration controller for eliminating particulate matter accumulated in an exhaust purification apparatus in an exhaust system of an internal combustion engine, in which exhaust having an air-fuel ratio passes through the exhaust system during engine operation, wherein the exhaust apparatus includes catalyst, the regeneration controller comprising:

a heating section for heating the exhaust purification apparatus and eliminating the particulate matter accumulated in the exhaust purification apparatus when an estimated accumulation amount is greater than a reference accumulation amount, the heating section obtaining the estimated accumulation amount by estimating the amount of particulate matter accumulated in the exhaust purification apparatus;

a temperature detector for detecting temperature of the exhaust purification apparatus;

a control section for repeatedly changing the air-fuel ratio of the exhaust between a rich state and a lean state to perform burn-up heating of the exhaust purification apparatus for burning the particulate matter accumulated in the exhaust purification apparatus and for continuously lowering the air-fuel ratio of the exhaust to perform normal heating of the exhaust purification apparatus, wherein the control section performs burn-up heating when the estimated accumulation amount is less than or equal to a burn-up start determination value and performs normal heating when the estimated accumulation amount is greater than the reference accumulation amount and the burn-up start determination value; and

a prohibition section for prohibiting burn-up heating when the period during which the temperature detected by the temperature detector is lower than a catalyst inactivation level is longer than a prohibition determination reference period.

3-4. (Canceled)

5. (Previously Presented) The regeneration controller according to claim 1, wherein the heating section performs normal heating when the prohibition section prohibits burn-up heating.

6. (Previously Presented) The regeneration controller according to claim 1, wherein:

the exhaust purification apparatus includes a first exhaust purification mechanism arranged in the exhaust system and a second exhaust purification apparatus arranged downstream from the first exhaust purification apparatus; and

the temperature detector detects as the temperature of the exhaust purification apparatus at least one of the exhaust temperature between the first and second exhaust purification mechanisms and the exhaust temperature at a downstream side of the second exhaust purification mechanism.

7. (Previously Presented) The regeneration controller according to claim 1, wherein the temperature detector detects as the temperature of the exhaust purification apparatus at least one of the temperature at an intermediate portion of the exhaust purification apparatus and the exhaust temperature at a downstream side of the exhaust purification apparatus.

8. (Currently Amended) A method for eliminating particulate matter accumulated in an exhaust purification apparatus in an exhaust system of an internal combustion engine, in which exhaust having an air-fuel ratio passes through the exhaust system during engine operation, the method comprising:

estimating the amount of particulate matter accumulated in the exhaust purification apparatus to obtain an estimated accumulation amount;

performing burn-up heating of the exhaust purification apparatus by repeatedly changing the air-fuel ratio of the exhaust between a rich state and a lean state to burn the particulate matter accumulated in the exhaust purification apparatus, when the estimated accumulation amount is less than or equal to a burn-up start determination value;

performing normal heating of the exhaust purification apparatus by continuously lowering the air-fuel ratio of the exhaust, when the estimated accumulation amount is greater than the reference accumulation amount and the burn-up start determination value;

switching the heating of the exhaust purification apparatus from the normal heating to the burn-up heating when the estimated accumulation amount obtained in a period in which heating of the exhaust purification apparatus is being performed becomes less than or equal to the burn-up start determination value;

detecting temperature of the exhaust purification apparatus; and
prohibiting burn-up heating when the detected temperature decreases to a catalyst inactivation level.

9. (Original) The method according to claim 8, wherein said prohibiting burn-up heating includes prohibiting burn-up heating when the detected temperature is less than or equal to a predetermined temperature.

10. (Original) The method according to claim 8, wherein said prohibiting burn-up heating includes prohibiting burn-up heating based on a period during which the detected temperature is less than or equal to a predetermined temperature.

11. (Previously Presented) The method according to claim 8, wherein said detecting temperature of the exhaust purification apparatus includes detecting temperature of the exhaust flowing through the exhaust purification apparatus.

12. (Previously Presented) The regeneration controller according to claim 1, wherein when the temperature detected by the temperature detector decreases to a catalyst inactivation level while the normal heating is being performed, the prohibition section does not prohibit heating of the exhaust purification apparatus.

13. (Original) The method according to claim 8, wherein when the detected temperature decreases to a catalyst inactivation level while the normal heating is being performed, prohibition of heating the exhaust purification apparatus is not performed.

14. (Previously Presented) The regeneration controller according to claim 2, wherein the heating section performs normal heating when the prohibition section prohibits burn-up heating.

15. (Previously Presented) The regeneration controller according to claim 2, wherein:

the exhaust purification apparatus includes a first exhaust purification mechanism arranged in the exhaust system and a second exhaust purification apparatus arranged downstream from the first exhaust purification apparatus; and

the temperature detector detects as the temperature of the exhaust purification apparatus at least one of the exhaust temperature between the first and second exhaust purification mechanisms and the exhaust temperature at a downstream side of the second exhaust purification mechanism.

16. (Previously Presented) The regeneration controller according to claim 2, wherein the temperature detector detects as the temperature of the exhaust purification apparatus at least one of the temperature at an intermediate portion of the exhaust purification apparatus and the exhaust temperature at a downstream side of the exhaust purification apparatus.